



## Open Source Hardware – A New Manufacturing Paradigm?

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### What is open source hardware?

At some point in their careers, most IT practitioners deal with open source software. Open source software presents a conceptual challenge to those who are used to dealing with the traditional proprietary licensing model in that, in a typical open source software license, licensees are granted freedoms in respect of the licensed software and, in some cases, they are subject to positive redistribution obligations, whereas under the traditional proprietary model, licensees are subject to restrictions. Today, a new movement is afoot in which this freedom concept has been extended to computer hardware.

Open source hardware (“**OSHW**”) refers to computer hardware designs made freely available to the public. These designs can be viewed, modified and distributed, by anyone who receives them and the resulting products can be sold by these users. This process is governed by license agreements that the original creators attach to the materials documenting their inventions. Although the OSHW licensed rights and obligations vary from agreement to agreement, there is a general framework to which all license agreements must conform in order to meet the communally accepted definition of OSHW. There are also a number of popular archetype agreements that have been created by the open source community that are freely available for use with any design.

### The Open Source Hardware Statement of Principles and Definition 1.0

The Free Cultural Works website sets forth the “Statement of Principles” and “Definition”<sup>1</sup>. The Definition describes OSHW as “a term for tangible artifacts -- machines, devices, or other physical things -- whose design has been released to the public in such a way that anyone can make, modify, distribute, and use those things.”<sup>2</sup> The Statement of Principles sets out the ideals behind OSHW, namely that it “gives people the freedom to control their technology while sharing knowledge and encouraging commerce through the open exchange of designs.”<sup>3</sup> This is supplemented by a general framework for the ideal distribution and form of OSHW.

The OSHW Definition 1.0 sets out twelve criteria with which all OSHW licenses must comply in order for the licensed product to be considered as OSHW. This framework is explicitly based on the definition that was originally written for open source software.<sup>4</sup> The twelve criteria include an

<sup>1</sup> *OSHW*, online: Definition of Free Cultural Works <<http://freedomdefined.org/OSHW>>.

<sup>2</sup> “Open Source Hardware (OSHW) Definition 1.0” *OSHW*, online: Definition of Free Cultural Works <[http://freedomdefined.org/OSHW#Open\\_Source\\_Hardware\\_28OSHW.29\\_Definition\\_1.0](http://freedomdefined.org/OSHW#Open_Source_Hardware_28OSHW.29_Definition_1.0)>.

<sup>3</sup> “Open Source Hardware (OSHW) Statement of Principles 1.0” *OSHW*, online: Definition of Free Cultural Works <[http://freedomdefined.org/OSHW#Open\\_Source\\_Hardware\\_28OSHW.29\\_Statement\\_of\\_Principles\\_1.0](http://freedomdefined.org/OSHW#Open_Source_Hardware_28OSHW.29_Statement_of_Principles_1.0)>.

<sup>4</sup> *Open Source Initiative*, online: Opensource.org <<http://opensource.org/docs/osd>>.

obligation to provide documentation (including design files), an obligation to allow modifications and derived works, a requirement of free redistribution, and a requirement that the license not restrict other items aggregated with the licensed work that are not derivative of it.

The OSHW Definition is silent on patents, which is the form of intellectual property protection that an inventor would typically seek in respect of his/her invention. Following the Definition there is some fairly confusing language that states:

*“In promoting Open Hardware, it is important to make it clear to designers the extent to which their licenses actually can control their designs. Under U.S. law, and law in many other places, copyright does not apply to electronic designs. Patents do. The result is that an Open Hardware license can in general be used to restrict the plans but not the manufactured devices or even restatements of the same design that are not textual copies of the original...”*<sup>5</sup>

This language seems to be saying that inventors should be looking to patents to protect the use of their designs and copyright to protect the “textual” copying of the design documentation. The statement “copyright does not apply to electronic designs” is misleading because in Canada<sup>6</sup> and the United States<sup>7</sup>, statutes emanating from copyright principles have specifically been enacted for the protection of electronic designs in the form of “integrated circuit topographies” which are also known as “semiconductor chip products”.

While the definition and principles are silent on patents, it would be counterintuitive for a free hardware movement to countenance restrictive distribution of open source hardware based on patent enforcement. How is this issue addressed? The answer lies in the license details.

## Popular Open Source Hardware Licenses

Various members of the open source community have released agreements that meet the requirements of the OSHW Definition 1.0 and are freely available for use as licenses to protect OSHW designs. Although there is no single authoritative/widely accepted OSHW license, some of the most popular include the Open Hardware Licenses (OHLs) offered by Tucson Amateur Packet Radio Corp. (“TAPR”) and the European Organization for Nuclear Research (“CERN”). In relation to patents, the TAPR license doesn’t use typical patent license language; instead it prohibits would-be licensors from enforcing their rights:

*“Although it does not prohibit anyone from patenting inventions embodied in an Open Hardware design, and of course cannot prevent a third party from enforcing their patent rights, those who benefit from an OHL design may not bring lawsuits claiming that design infringes their patents or other intellectual property.”*<sup>8</sup>

If one accepts the premise that a license is merely a covenant not to sue, then presumably the TAPR license also qualifies as a patent license. However, while there are similarities, in some cases courts have characterized covenants not to sue as equivalent to licenses and in others, not.<sup>9</sup>

<sup>5</sup> *Supra* note 3.

<sup>6</sup> *Integrated Circuit Topography Act* (S.C. 1990, c. 37).

<sup>7</sup> In 1984, the *Semiconductor Chip Protection Act* amended title 17 of the *United States Code* to add a new chapter 9 entitled “Protection of Semiconductor Chip Products.” Pub. L. No. 98-620, 98 Stat. 3347.

<sup>8</sup> “The TAPR Open Hardware License Version 1.0” TAPR, online: Tucson Amateur Packet Radio Corp. <[http://www.tapr.org/TAPR\\_Open\\_Hardware\\_License\\_v1.0.pdf](http://www.tapr.org/TAPR_Open_Hardware_License_v1.0.pdf)>.

<sup>9</sup> Marc Malooley, “Patent Licenses Versus Covenants Not to Sue: What Are the Consequences?”, online: Brooks Kushman <[www.brookskushman.com/Portals/0/NewsPDFs/131.pdf](http://www.brookskushman.com/Portals/0/NewsPDFs/131.pdf)>.

The CERN license uses more representative licensing language. It states:

*“The Licence includes a licence to those patents or registered designs that are held by the Licensor, to the extent necessary to make use of the rights granted under this Licence. The scope of this section 3.4 shall be strictly limited to the parts of the Documentation or modified Documentation created by the Licensor.”<sup>10</sup>*

These two licenses are otherwise generally quite similar in terms of the rights they afford to creators and users of OSHW:

- Both allow for the use, distribution, modification, production and sale of OSHW designs;
- Both agreements are accepted the moment a recipient exercises any of these rights, and terminate the moment any of the terms of the license are violated;
- Both grant recipients with a perpetual and worldwide license that renders them free from legal action by the original creator or any other recipients of the licensed OSHW;
- Both licenses require any derived works to remain open source and use the same license agreement as the original design;
- Both licenses require that the original creators be notified of all modifications to their design;
- Both licenses require that all notices included with OSHW designs (including those pertaining to copyrights and trade-marks) are kept intact whenever those designs are distributed in either original or modified form;
- Both licenses require that any products made from OSHW designs be distributed with the original design (and the modified form if applicable) as well as any related notices or documentation. The TAPR OHL allows products to be distributed without this information if it is made available by request for a period of at least three years; this is by and large the only substantive difference between the TAPR and CERN OHLs;
- Notably, both licenses also specifically state that they do not apply to software.

### **Is OSHW Just for Hobbyists?**

A *Wired* magazine feature from 2008<sup>11</sup> details the answer to a common question for OSHW producers: how do these companies make money? One answer is that OSHW is less about selling the tangible hardware than it is about advertising for its designers. As SparkFun CEO Nathan Seidle has said, OSHW “isn’t a business model, it’s a business driver.”<sup>12</sup> OSHW businesses like SparkFun have served to launch the people behind them into other, more traditional business ventures by displaying their expertise. The more widely used, produced, and distributed an OSHW product is, the better, since this simultaneously disseminates the identities of those responsible, the quality of their work, and the popularity of their ideas. Additionally, by virtue of its unusual nature, OSHW designs and products have attracted attention simply for being a new and strange phenomenon. This extra attention has only helped the self-advertising aspect of the process for OSHW designers as their innovation has in-and-of-itself been deemed newsworthy.

<sup>10</sup> “Documents” *CERN Open Hardware Licence*, online: Open Hardware Repository <<http://www.ohwr.org/documents/88>>.

<sup>11</sup> Clive Thompson, “Build It. Share It. Profit. Can Open Source Hardware Work?” *Wired*, online: Wired.com <[http://www.wired.com/techbiz/startups/magazine/16-11/ff\\_openmanufacturing?currentPage=all](http://www.wired.com/techbiz/startups/magazine/16-11/ff_openmanufacturing?currentPage=all)>.

<sup>12</sup> Jonathan Feldman, “Is open source hardware IT’s next big thing?”, *InformationWeek*, online: UBM TechWeb <<http://www.informationweek.com/news/global-cio/interviews/240000260>>.

Possibly the strongest signal that open source hardware is moving into the mainstream is Facebook's "Open Compute Project" in which Facebook designs its own hardware, has it manufactured in Asia and then releases the designs on an open source basis. Frank Fankovsky, Director of Hardware Design and Supply Chain at Facebook, says that the large computing operations scale required by Facebook, the related cost structure and environmental impact drive different requirements. However, rather than putting hardware vendors out of business, this open source hardware movement provides opportunities for emerging new providers to distribute and service the hardware.<sup>13</sup>

## Conclusion

OSHW producers dispute the claim that their designs and products are strictly for hobbyists. As the so-called "Maker Movement"<sup>14</sup> continues to gather momentum, OSHW enthusiasts are adamant that the practice will follow in the steps of open source software and move into the mainstream.<sup>15</sup> Certainly adoption by Facebook indicates that serious players are now involved. The fact that the business model involves the production and logistics of shipping and servicing tangible items bodes well for companies who can excel in those activities. As for the licensing lawyer, open source hardware represents a variation on a theme that we have come to understand in the software field; however, the nature of the licenses and ongoing patent issues may present new challenges.

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<sup>13</sup> Julie Bort, "Inside Facebook's Plan To Revolutionize The Entire Hardware Industry" *Business Insider*, online: <<http://www.businessinsider.com/inside-facebooks-plan-to-revolutionize-the-entire-hardware-industry-2012-8#comments>>.

<sup>14</sup> TJ McCue, "Moving the Economy: The Future of the Maker Movement" *Forbes*, online: Forbes.com LLC <<http://www.forbes.com/sites/tjmccue/2011/10/26/moving-the-economy-the-future-of-the-maker-movement/>>.

<sup>15</sup> *Supra*, note 41.